Jobs Through Recycling
National Recycling Market Development Roundtable
April 15 and 16, 1999
San Francisco, California

THURSDAY, APRIL 15

Welcoming Remarks

Heidi Hall from the U.S. Environmental Protection Agency's (EPA's) Region 9 office welcomed everyone to the roundtable. She highlighted the success of the Jobs Through Recycling (JTR) program, drawing particular attention to California's JTR grantee—the California Integrated Waste Management Board (CIWMB) and its "R-Team." She noted that CIWMB's grant has significantly helped the state meet its 50 percent waste diversion goal. Nationwide, the JTR program has provided $8 million in funding to states, tribes, and multistate organizations since 1994. To date, JTR "seed funding" has helped create more than 7,100 jobs, generate $459.8 million in capital investment, create 14 million tons of capacity, and utilize 12.9 million tons of recovered materials.

She noted that EPA organized the roundtable to build on this success and bring recycling market development experts together to stimulate creative energy. With the possibility of further EPA budget cuts, she encouraged attendees to explore opportunities to secure new partnerships and leverage new sources of funding. She concluded by stating she was excited about the opportunities facing the group and about working to achieve them together.

Agenda Review and Orientation

John Leigh, EPA's JTR program manager, welcomed everyone to the event. He noted that the roundtable included 120 participants with a large representation from both the east and west coasts. He further noted that attendees represented 30 state agencies, 17 nonprofit recycling organizations, 7 recycling companies, 1 Native American tribe, 9 EPA regional offices, and 9 consulting firms. He encouraged everyone to take advantage of the interesting mix of expertise. He stated that in some ways, the country is at a crossroads in recycling market development. The roundtable was designed to help plan for the future by sharing success stories, best practices, and lessons learned. It also provides an opportunity for self-analysis based on real stories of what is happening in the field.

In organizing the event, EPA attempted to design a more open-ended roundtable than last year. The agenda allows more opportunities for networking, smaller groups discussions, and exercises and games. It also includes more in-depth information on commodities. Mr. Leigh proposed three guiding principles for the event: work hard, play fair, and have fun. He noted that the goal was to provide a candid, informal opportunity to learn from one another and enhance market development efforts.

Keynote Address

Dobbin Callahan, Collins & Aikman

Collins & Aikman (C&A) is a floor covering company with 23 years of experience that manufactures a recovered-content nylon face carpet with a vinyl composite backing. Mr. Callahan began by focusing on the concept of sustainable growth, which he described as growth that meets economic needs in an environmentally responsible way. Sustainable growth represents the convergence of social, economic, and environmental goals.

The company has achieved success in the following areas:

- **Source reduction**. C&A uses 20 percent less yarn than the industry average. This represents a 10 percent reduction from 1994 and amounts to a savings of approximately 475 football fields of yarn per year. Currently, the company produces approximately 10 million yards of yarn per year.

- **Lifecycle performance**. The company has a minimum 15 year nonprorated warranty for its products. It is using 33 percent less energy per square yard today. It also has reduced particulate emissions to the atmosphere by 89 percent. The company's RS backing eliminates the need for adhesives, which is the biggest contributor to indoor air quality concerns. Its operations emit no measurable volatile organic compounds.

- **Waste reduction**. C&A won the Georgia Governor's Award for Pollution Prevention and reduced the amount of material (waste per square yard) sent to the landfill by 79 percent over the past 5 years.

Mr. Callahan then discussed the company's "Infinity" initiative. He described it as a story of human ingenuity. Essentially, C&A's customers told them they wanted environmentally friendly products. In response, C&A invested $15 million in capital expenditures on a new recovered-content floor covering product. He described how C&A employees are fueled by a passion for the company, the product, and doing something positive for the environment.

Because the company had no existing program for closed-loop recycling for its floor coverings, it began by defining a "true closed-loop recycling system" in the following 10 steps:

1. **Must bring back any product made**. C&A will take back any product the company made in its 33-year history, whether the carpet was bought or leased.

2. **Must use 100 percent of the recovered material**. At C&A, nothing is separated out, stored, landfilled, or incinerated. All recovered materials are used in the production of new products.

3. **Must recycle 100 percent of the material back into floor coverings**. The recovered material becomes the backing for new floor coverings. In fact, the backing is the highest performance aspect of the floor coverings.

4. **Must have 25 percent recycled content**. C&A's recovered-content floor covering contains at least 28 percent recovered material and sometimes larger percentages.

5. **Must have same quality as original**. During quality and performance tests, C&A's modular tiles performed better than any product the company has ever tested.

6. **Must be price equivalent**. The recovered-content floor covering sells at the same price as the virgin content product.

7. **Must have comparable aesthetics**. Both the virgin and recovered-content carpeting are aesthetically pleasing.

8. **Must recapture embodied energy.** According to Mr. Callahan, no energy is lost in the remanufacturing process.

9. **Must create products that are recyclable**. C&A's products are 100 percent recyclable.

10. **Must be commercially operational program**. The recovered-content products are sold today.

C&A uses a five-step process to produce its recovered-content floor coverings: 1) the recovered floor coverings are size reduced, 2) the plastics are processed into pellets, 3) at molten temperatures, an extrusion process creates the raw material for manufacturing, 4) a process known as "calendering" further prepares the feedstock, and 5) the carpet backing is manufactured into rolls and is ready for the finished product.

C&A has signed contracts with several major governmental organizations to supply approximately 3 million pounds of material—equivalent to $6 million of business and roughly 385,000 square yards of carpeting. In 1999, C&A anticipates approximately $60 million in sales. C&A has the only high-performance product on the U.S. General Services Administration (GSA) schedule. A large part of their success has resulted from partnering with other groups such as the National Recycling Coalition's (NRC's) Buy Recycled Business Alliance. From 1993 to 1998, C&A added 318 jobs and increased sales by 85 percent. Currently, the company is growing at a rate of 10 to 15 percent per year.

Q: What barriers face your company?
A: We'd like the public to be more perceptive about recycled-content claims and the importance of buying recycled.

Q: A closed-loop system where the recovered materials are returned to manufacture the original product does not work for all materials. What are your thoughts on this?
A: Our company strives for a closed-loop system, but we also use recovered materials for other products—a process we call "downcycling." Without a closed-loop system, we are not substantially diminishing the need to extract resources from the earth.

Q: What are the cost savings in waste disposal from your recycled products?
A: Our products result in significant avoided disposal costs since the tipping fee in our area is $25 ton. In addition, there are significant energy reductions because our products use less water, which means less water needs to be heated during production.

Q: How do you get the recovered carpet back to your company?
A: We have not solved this challenge yet. Essentially, we treat each case separately. If someone has

carpet to return, they simply call us and we work out a way to get the carpet. We also are partnering with others in the industry (e.g., Dupont) to reclaim carpeting. This continues to be a challenge and an area of focus for the company.

Q: Why don't all of your products contain recovered content?
A: We only produce a recovered-content tile product. We have not, however, perfected the technology for using recovered materials in our cushion back roll, so we continue to use virgin materials for this product.

Q: Do you take back your competitors' products?
A: Yes, if they use a similar technology to produce their floor coverings, we can use their product as feedstock in our operations. We ask only that we get to supply a replacement for the product.

Q: Is there recovered-content in the upper fiber? Are you concerned about feedstock supplies?
A: We use some recycled content in the upper fiber, but do not count it because it is such a low percentage. We plan to increase the recycled content once we learn how to do so without compromising quality. No, we are not concerned about feedstock supplies. Because we have been manufacturing the product for so long, we have many sources we can tap into.

Recycling Economic Information (REI) Project

Will Ferretti, National Recycling Coalition

The recycling industry has no leverage without knowing the size or data on the industry. Some states and regions have collected data but each has used a different methodology, which makes it impossible to aggregate the data. With this in mind, EPA granted $175,000 in JTR funding to NRC and the Northeast Recycling Council (NERC) to embark on a definitive study of the economic impact of the recycling industry in the United States.

The project will be completed in three phases. Phase I is underway and involves collecting data from states in the Northeast. By July, NRC/NERC hope to initiate Phase II and broaden the study to the rest of the country. During Phase III, the project partners will customize data on both a state and regional level.

The study focuses on 35 categories of recycling, reuse, and remanufacturing businesses. It also takes into account activities, such as consulting, that support industry sectors. For each material category, NRC/NERC will analyze the direct economic impacts through data on the number of business establishments in operation, total employment, total wages paid, the value of goods and services provided, and annual throughput. The study also will assess the indirect and induced economic impacts or "ripple effects" of recycling efforts. Thus far, NRC/NERC plan to produce state-specific reports for five states.

Mr. Ferretti then previewed the project's preliminary data for Delaware and New York. This demonstrated the full range and level of data that will be developed for the different business categories. To collect the data, NRC/NERC will use an algorithm as well as census data and surveys. At this stage, NRC/NERC are still recruiting states to join.

Q: How do you define "recycling businesses" for purposes of the study?
A: With regard to census and other available data, there is no category for "recycling" businesses; rather, recycling businesses are spread out among a whole range of business categories such as paper or glass manufacturers. To minimize error, we will try to be consistent throughout the study and be clear in the surveys we conduct.

Q: How do the existing state and regional findings compare with this study? Is there a way to use data from these studies?
A: Each of the studies uses a different methodology, which makes it difficult to compare the findings with one another and our national study. Essentially, each methodology differs in its level of comprehensiveness. To develop our methodology, we reviewed the methodologies of the existing studies and took into the account their strengths and weaknesses. Our methodology is a synthesis of all the existing methodologies. In addition, our study will generate baseline data that could be updated on an annual or biannual basis.

Q: How much confidence will you have in the indirect and induced economic impacts?
A: To estimate these figures, we are using an input/output model called INPLAN. It is used by many states and localities to estimate the impacts from specific economic development projects and will work well with our project, too.

Q: How will you use the data?
A: NRC plans to use the results to leverage greater attention from the Clinton Administration and the Congress. We hope to demonstrate the success of recycling and gain increased financial support for EPA programs as well as recycling programs nationwide. The data is needed in order to allow the recycling industry to compete with other industries.

Q: Does the report include organics?
A: Yes.

Q: Will the data be state specific or regional?
A: There is a large need for both types of data to demonstrate recycling's success.

Q: How different is INPLAN from the REMI model used by Minnesota and other approaches? Will the studies being done by states outside the project be included?
A: INPLAN is comparable to the REMI model although it uses different inputs. All of the work from Phase I with the Northeast will be incorporated into the national study. We are not aware of any other states doing economic impact studies on their own. If other states independently conduct studies, we need to be careful there is direct transferability of results and that the data sets are comparable. Mr. Ferretti encouraged other states to support the REI project, and he explained the sponsorship opportunities available.

Commodity Targeting and Strategic Planning: Deciding Where and How to Focus Efforts

Carol Brown, CWC

Ms. Brown began by noting there is no cookie cutter approach to recycling market development. She

noted the importance of understanding how the different stages of the recycling process—generation, collection, handling, processing, and markets—fit together. She further noted that recycling is a dynamic process. Markets change everyday and can never be "solved;" rather, developing markets requires flexibility and the ability to adapt as circumstances change. In some ways, recycling markets resemble energy or water usage. They must be constantly monitored in order to decide where to invest and how to anticipate changes.

In deciding which commodities to target, you need to understand the primary factors influencing your decision: diversion potential, economic development potential, and policies and regulations (e.g., material bans, taxes, or tip fees). Also, your focus might change over time. You might, for example, evolve from diverting wood waste for mulch to a higher-end application such as pulp and paper feedstock.

In identifying which commodities to target, she recommended weighing the need for the commodity, the existing opportunities, and your ability to influence the market. In working with King County, Washington, for example, CWC asked the following questions: How much material is there? How easy is it to collect? What kind of supply infrastructure is already in place? Are there any existing manufacturers? CWC develops a prioritization matrix to graphically depict the tradeoffs between need, opportunity, and ability to influence the markets.

She then outlined CWC's step-by-step approach to commodity targeting and strategic planning:

1. **Opportunity assessment**. Thoroughly assess the opportunities for different materials. This should account for trends in the industry.

2. **Stakeholder development**. Build industry advocates and "make a broad circle" by involving a lot of stakeholders. In a Colorado demonstration project, for example, CWC brought stakeholders together to discuss the opportunities for pelletizing plastic. The group decided that doing so would have no net impact on the markets so they abandoned the project early on before significant time and resources were wasted.

3. **Prioritization**. Carefully prioritize which products to focus on. Develop both short- and long-term strategies. A lot will depend upon available resources.

4. **Pilot projects**. In real life, projects never work like they do "on paper." Conduct a pilot project first to test out new ideas.

5. **Process**. Have a process in place that can be revisited and refined. Make the critical links throughout the recycling chain from generators to end markets.

John Blaisdell, North Carolina Recycling Business Assistance Center (RBAC)

Mr. Blaisdell discussed the North Carolina RBAC's new report, *Assessment of the Recycling Industry in North Carolina: 1998* Update, which assesses the market development opportunities for 26 commodities. It includes estimates of supply and demand as well as generation and recovery for each commodity. As part of the report, the RBAC generated a 4-year price history for each commodity and developed a series

of recommendations.

An assessment provides valuable market information and develops data for both new and existing businesses. The RBAC's assessment found that construction and demolition debris (C&D) debris (33 percent), organics and wood (24 percent), and paper (18 percent) are the largest components of the state's waste stream. Based, in part, on this data, the RBAC placed a high priority on C&D debris, organic material, paper, wood residue, and used oil filters; a medium priority on electronics, used oil, and plastics; and a low priority on glass, metals, and textiles.

To promote market development, the RBAC will consider both policy and programmatic initiatives. Examples of policy initiatives include investigating disposal bans (e.g., pallets and used oil filters), expanding procurement of recycled-content and environmentally preferable products, and developing an enforcement policy for cathode ray tube recovery. Program recommendations include collecting additional data on C&D debris and organics, enhancing local government program efficiency, targeting retail and commercial collection, and increasing plastics recovery.

In particular, Mr. Blaisdell highlighted the RBAC's analysis of paper, electronics, and C&D debris. Regarding C&D, he noted approximately 2.5 million tons is generated in the state per year. Of this total, gypsum wallboard amounts to roughly 335,000 tons. By working with a local company, Waste Products Recycling Corporation, to recover the gypsum wallboard and create new products, the RBAC has helped create 50 jobs, generate $2.8 million in capital investment, and create 50,000 tons per year in capacity.

Mr. Blaisdell concluded by noting that global trade is a large factor in local demand as are the prices and manufacturing capacity for virgin products. He also noted the need for strengthening buy-recycled efforts and addressing inefficiencies and under-served sectors in the market.

Chris Cloutier, Minnesota RBAC

Mr. Cloutier discussed the RBAC's material targeting and strategic planning efforts in Minnesota. Targeting a select group of commodities has allowed Minnesota to prioritize project funding to provide maximum support for local collection efforts, provide a benchmark for evaluating success, and increase resource efficiency.

Mr. Cloutier discussed historical market development targeting efforts including the 1990 state strategy for market development, which helped define the "players" and opportunities for market development. It also defined the roles and responsibilities for each player (e.g., economic development vs. recycling agencies). He further discussed Minnesota's market development grant and loan programs from 1989 to 1996. The loan program, in particular, is an example of targeted funding. The program awarded $3 million to market development projects for carpeting, paper, plastic, and wood fiber market development.

Similarly, each JTR grant has targeted a different set of materials. The 1993 grant targeted composites, wood fiber, and plastics. This was, in part, based on a 1992 study that highlighted composite product manufacturing as a major growth sector of the economy and emphasized the size and growth potential of the plastics and wood fiber industries. The 1997 grant targeted latex paint, glass, and PET plastics based on feasibility studies and other market research conducted by the RBAC.

As part of the JTR application, the RBAC developed a detailed outline of anticipated activities and outcomes and identified potential partners. The application also allowed the RBAC to divide its work among different commodity specialists so each could hit the ground running once the grant was in place. In essence, Minnesota's JTR implementation plan followed five steps: meet with partners and confirm commitments, develop technical knowledge, begin preliminary activities with partners, evaluate outcomes and redefine workplan as needed, and target new material-specific projects.

Q: Why weren't community groups listed as a key audience? They have been a key constituency in New York City. Also, the public health perspective and the vehicle miles traveled are important considerations.
A: You need to go through the exercise of identifying stakeholders and the main drivers for each economic development project. The community is a key partner. CWC has found location is the single largest variable.

Q: It appears that states are moving away from the traditional commodities. Is that the case?
A: In North Carolina, we were surprised to learn the percentage of C&D material in our waste stream. As a result, we have placed a priority on building a collection infrastructure for these materials. In Minnesota, we have tried to look to new and innovative uses for materials. We have tried to help local communities drive down costs but also develop sustainable recycling programs.

Q: In Nebraska, C&D materials are often illegally dumped. We have looked at public policy options to discourage this. Has North Carolina considered looking at it?
A: Not on the state level in North Carolina; certain cities and towns, however, have looked at the issue.

Q: How would you use the REI report?
A: Minnesota uses recycling economic information as a sales tool to promote the success of recycling businesses. In Iowa, we also look at the flow of commodities out of state. We need this information to determine which commodities have the greatest economic value and where to spend our time. We think a recycling economic study should go further than jobs created and include more analysis.

Concurrent Commodity Workshops: Paper

Dave Ryniec, Weyerhaeuser

Mr. Ryniec provided an overview of the recovered paper industry as well as present and future issues affecting paper recovery. He began by noting paper and paperboard constitute 71 percent of all recovered materials. Of the paper recovered, 81 percent is recycled at U.S. mills, 16 percent is exported, and 3 percent is used for other uses. The paper industry is now producing 92 million tons of paper and paperboard annually.

U.S. recovered paper mills produce the following products: containerboard (45 percent), boxboard (23 percent), tissue (11 percent), newsprint (9 percent), printing and writing (7 percent), packaging (3 percent), and construction paper (2 percent). Recovered paper use at U.S. paper mills has grown from 25.1 percent in 1988 to 37.6 percent in 1997. In the U.S., paper and paperboard recovery has grown from 30.5 percent in 1988 to 45.2 percent in 1997. The American and Forest Paper Association's (AF&PA's) stated goal is 50 percent recovery by 2000.

He then discussed the following paper items:

- **Old Corrugated Containers (OCC)**. Recovered OCC is recycled into containerboard (67 percent), paperboard (17 percent), net exports (11 percent), tissue (1 percent), and other paper types (5 percent). Recovery of OCC has climbed from 52 percent in 1988 to 73.4 percent in 1997. Seattle recovers 90 percent of its OCC. No one has measured the effect of increased OCC use due to increases in Internet mail orders.

- **Old Newspapers (ONP)**. Recovered ONP is recycled into newsprint (39 percent), net exports (25 percent), paperboard (21 percent), tissue (7 percent), printing and writing (3 percent), containerboard (1 percent), and other paper types (5 percent). Recovery of ONP has grown from 35.1 percent in 1988 to 67.5 percent in 1997. Most ONP is recovered through curbside programs. Canada and Japan are large U.S. export markets.

- **Printing and Writing**. These items are recycled into paperboard (26 percent), tissue (26 percent), printing and writing (24 percent), net exports (15 percent), newsprint (4 percent), and other paper types (5 percent). Recovery of printing and writing papers has increased from 23.6 percent in 1988 to 33.3 percent in 1997. Recovery of office papers has grown from 26.1 percent in 1991 to 38.2 percent in 1997. Mr. Ryniec believes printing and writing paper recovery can reach 40 percent.

In the early 1990s, government mandates to increase the recycled content in paper led paper companies to invest in new mills and find new sources of recovered paper. Unfortunately, some of these mills never went online due to a lack of recovered feedstock and a lack of demand for their product. At least 5 stand alone pulp mills on the east coast failed; only the integrated mills survived.

He believes more private sector demand is needed to drive the markets. In San Francisco, for example, a group of companies decided to purchase recycled content paper which has helped local markets. Voluntary guidelines in states are not enough; minimum content legislation for printing and writing papers is needed at the state and local level to spur demand.

Growth of recovered paper consumption at U.S. mills has decreased from a high of 10.7 percent in 1992 to 3.3 percent in 1999. The American Forest and Paper Association projects paper consumption to grow 3.2 percent in 2000 and 1.1 percent in 2001. Mr. Ryniec then discussed incremental recovered paper consumption by the U.S. paper industry, fiber consumption growth, and incremental paper industry fiber consumption from 1987 to 1997.

He concluded with the following recovered paper highlights:

- Approximately 70 percent of the paper industry's incremental fiber consumption was derived from recovered paper during the past decade. Some of this reflects consumers' desire for recycled-content paper, but favorable economics probably played the dominant role.

- Once a 50 percent recovery rate is reached, incremental gains will be difficult to achieve.

- Export demand is likely to increase more rapidly than domestic demand over the long run, creating tension between domestic and export demand for recovered paper. He noted paper

exports are recovering after a large drop in 1996, during which many foreign paper companies went out of business.

- Recoverability and quality will remain long-term issues. Commingling of collected paper causes many problems at paper mills as it increases contamination levels. Mills need to be innovative to deal with this issue; the Snow Flake paper mill in Arizona uses new techniques to remove contamination. Stickies and adhesives present major challenges, as well. 3M has changed the glue in its products but no results have been reported yet. Recognizing that postage stamps create problems, the paper industry has been working with the U.S. Postal Service but have not yet found a solution.

- More consolidation is expected in the paper industry which will likely have large economic impacts. Approximately 1,500 jobs have been lost in the recent past and more cuts are likely. He does, however, expect an upturn in the markets within the next 1 to 2 years.

Concurrent Commodity Workshops: C&D

Lisa Geller, Materials for the Future Foundation (MFF)

Ms. Geller discussed MFF's experiences with wood waste as well as its deconstruction initiatives. She began with an overview of generation and recovery issues. According to the National Association of Homebuilders (NAHB), 245,000 building units are demolished each year. EPA estimates 125 million tons of debris was generated in 1996. The U.S. Department of Agriculture (USDA) estimates 3 trillion board feet of lumber is produced each year to build 1 million housing units. Finally, USDA estimates more than 550,000 building units are more than 29 years old.

The economics of wood recovery varies widely from case study to case study. Typical costs include labor, debris disposal, storage, transportation, and hazardous materials (usually asbestos and lead) management. Revenues vary as well depending on the value of the salvaged wood and local markets. The types of wood recovered varies by region; buildings in California are primarily constructed with Douglas firs. The choice of building and goals of the project are important factors, too. MFF has found that deconstruction rarely costs less than demolition, primarily because of the added labor involved. It also is important to factor job training and job creation into the cost/benefit equation.

To avoid flooding the market with recovered wood, it is important to understand the price-sensitive and volatile nature of wood markets. Quality also is a key factor. Mill-reclaimed wood, for example, is challenging because of the metal involved. The value of wood can be enhanced by resurfacing and other processing.

Many materials salvaged from deconstruction projects can be recycled into new products. MFF found wood has the most promise in terms of job creation and a higher end use in remanufacturing. Ms. Geller then noted several reclaimed lumber trends including green building, rising quality expectations, and a variable supply. She stressed the importance of not overselling the value of wood. Only 25 percent of wood in the recovered waste stream is superior to virgin wood. She also discussed several opportunities including the current strong regional and national markets for recovered wood. Recovered lumber, timber, and beams are being used for manufacturing furniture, doors, architectural millwork, and small items.

MFF works with nonprofits, small businesses, and local governments on a variety of deconstruction projects. One project, for example, involved deconstruction at closing military bases in the San Francisco Bay area. Another project, the Youth Employment Partnership, trains low-income young adults (ages 18 to 24) to deconstruct buildings on the Port of Oakland property and build homes. Throughout the project, MFF will train 113 kids over the next 18 months and divert 7.8 million board feet from disposal over the next 5 years. The project is tied to the state's "welfare to work" program. In another project, MFF is working with EcoTimber International to deconstruct 4 buildings on a 135-acre old mill site in the Sierra foothills.

Kevin McCarthy, Waste Management, Inc.

Mr. McCarthy gave an overview of the state of wood waste and scrap tire recovery. He began by discussing the following four opportunities for wood waste:

- **Reuse**. Currently, medium density fiberboard has a market value of between $30 to $45 per bone dry ton (BDT) but is expensive to process. Construction wood, not demolition wood, is typically reused.

- **Biomass fuel**. This comprises the largest end market for wood waste—between 70 to 80 percent of all end markets in California. Currently, wood waste is worth between $10 to $30 per BDT as biomass fuel. It is inexpensive to produce, yet over the past 8 years, the number of biomass fuel plants in California has sharply decreased—from 51 plants in 1990 to 30 plants in 1998. This is partially because government subsidies for the plants (which reduced the costs of operations) are being phased out.

- **Compost**. Compost has a market value of between $4 to $10 per ton. The limited markets are tied to the overall growth of the composting industry.

- **Mulch**. Mulch has a value of $1 to $4 per ton.

Mr. McCarthy then discussed the growing markets for scrap tires. He noted that approximately 16.4 million tires are illegally disposed of each year.

- **Tire Derived Fuel (TDF).** Approximately one-third of the tires recovered in California are used to produce TDF. Currently, TDF has a market value of $30 (for whole tires) to $15 (for chipped tires) per ton. TDF plants are tightening specifications, however, which could increase the cost of tire processing.

- **Crumb Rubber**. This has a market value of $300 per ton. Crumb rubber is used in asphalt and as a soil amendment in mulches.

John Armando, Raisch Products

Mr. Armando discussed the recovery options for used asphalt and gypsum wallboard. He began by noting the tremendous volume of asphalt that is not being recycled. The biggest opportunity for recovered asphalt is recycled asphalt pavement (RAP) where the recovered asphalt is mixed with virgin

asphalt. This process recovers rocks and oils which strengthen the mix. Recovered asphalt is best if mixed with concrete although it is costly to separate the two at the end of its useful life. Adding rubber, glass, and shingles to the asphalt mix improves the material. Adding rubber to asphalt is actually believed to extend the life of the asphalt. Shingles can help compact the mix but can be costly to use.

According to Mr. Armando, roofing shingles (comprised of fiberglass, rubber, and rock) can contain up to 5 percent recovered materials. He believes recycling roofing shingles—for temporary roads, base rock, and as part of a hot asphalt mix—will be "the next big thing."

Regarding gypsum wallboard, he noted each manufacturer uses a different mixture for their products. Thus, contamination is a large barrier for recycling businesses interested in recovering this material. Currently, gypsum wallboard is being recovered for agricultural markets and the wallboard industry. The equipment currently used, however, is not specifically designed for recovered wallboard; it has been retrofitted. Thus, there is a need to develop specialized equipment. Finally, specifications are being developed for scrap tires. This will allow the scrap tire industry to diversify its end markets.

Q: What amount of money is needed to support the deconstruction industry? Who are likely project partners?
A: It depends on what you want to do. Projects can range from small jobs to multi-year endeavors. With large projects, you can take advantage of economies of scale in regions where tipping fees are high. Potential partners include state and local government agencies, the U.S. Department of Housing and Urban Development, and the U.S. Department of Health and Human Services. The projects supply entry-level jobs; thus, they are a good match with the "welfare to work" program.

Q: Where can I find different recipes for asphalt shingles?
A: Call the Alameda County Recycling Board at 408 227-9222 for a copy of their recent study. Also, contact the National Roofing Association.

Q: What do you have to go through to separate asbestos from roofing shingles?
A: This is not really an issue since the use of asbestos in roofing shingles has been phased out. As there are no inspection protocols or regulatory procedures in California for testing, Raisch Products simply tests loads as they arrive to check for contamination.

Q: What is the maximum recycled-content percentage for RAP with the new microwave technology?
A: RAP can contain up to 100 percent recovered material, although mixes typically use between 5 and 25 percent. One attendee described a new recycled asphalt application used in Philadelphia. The equipment grinds asphalt from the roadway, creates a new asphalt mix using the recovered material, and applies the new asphalt on site.

A: One of the biggest barriers to a "C&D recycling park" is the "not in my backyard" syndrome. Making room for a deconstruction company at an existing landfill or transfer station is one way to avoid this issue. It could, in turn, create a retail sales opportunity at the solid waste facility.

A: CWC noted one of the biggest market barriers to the use of recovered wood is the lack of specifications. In one case, a project failed because the re-milled lumber did not meet specifications. As a result, CWC is working with USDA's Forest Product Laboratory to write new specifications for recovered wood. The specifications are currently out for comment. Another attendee noted EPA Region 3 saved significant money by recovering substantial material during its recent office renovation.

Q: What tools can local governments use to encourage new projects?
A: The Alameda County Task Force is working on a countywide C&D ordinance that would encourage deconstruction and reuse. If one municipality develops it, it could have a ripple effect throughout the region. In San Francisco, local elected officials are considering a deconstruction ordinance.

Revolving Loan Funds and Other Public Financing Tools: Comparisons, Benefits, How to Initiate and Operate

Ed Boisson, Northeast Recycling Council

The challenge with financing recycling businesses is everything has to go right: favorable market conditions, qualified entrepreneurs, sufficient information to evaluate business ventures, a quality business plan, selection of the appropriate financing source, informed and motivated financiers, shopping and closing the deal, and a successful business operation. Market developers tend to only focus on closing the deal. We need to realize the task is much larger than that.

He also discussed direct financing programs including grants, loans, loan guarantees, bonds, equity investments, tax credits, incentive payments, and credit enhancements. Indirect financing programs include investment forums, networks and consortia, education and information, and market development policies and legislation.

Mark Cullors, Alameda County Solid Waste Authority

Alameda County has a revolving loan fund that provides financing to small- and medium-sized businesses. It is the only fund in the country dedicated to source reduction and recycling. The fund is supported by a $6 per ton surcharge on materials disposed of in the county. Funding can be used for operations, accounting, marketing, workshops, and seminars. It targets startup businesses and others looking to expand and has funded plastic, glass, spent foundry sand, and paper companies. The board identifies businesses through a variety of ways: word of mouth, cold calls, the Internet, state recycling marked development zones (RMDZs), local economic development organizations, and city chambers of commerce.

The fund was designed with stakeholder input including the Northern California Loan Fund and the National Development Council. Through a survey process, the county assessed the needs of recycling businesses, including plans for growth and financing needs and tailored the program accordingly. Thus far, the county has financed 20 loans for $1.8 million, diverting 210,000 tons of material and leveraging an additional $500 million. Loan amounts range from $10,000 to $200,000. The fund offers a 5 percent interest rate and a 5 year term.

Flexibility and service are key. Thus far, no company has ever defaulted on a loan. Mr. Cullors attributes this to treating each loan as a loan, not a grant; expecting repayment; using due diligence; seeking at least 3 years of financial records from applicants; requiring a business plan; and conducting client interviews. He further recommends obtaining liens on property, being flexible in setting up lending practices, securing adequate collateral on loans, and using financial professionals to review and administer the loans. Involve finance professionals on a review committee. Finally, maintain a short turnaround time for

awarding the funds. It takes 30 days or less for Alameda to review a completed application and award a loan.

Steve Long, Massachusetts Department of Environmental Protection (DEP)

Massachusetts also manages a recycling loan fund. It awards loans ranging from $50 to $30,000 to haulers, processors, and retailers. Since 1996, the state has awarded 12 loans for $1.8 million, leveraging an additional $7.85 million. The state plays a "hands off" role; a private contractor (the Massachusetts Business Development Corporation) underwrites and administers the fund. The state's primary role is to verify that companies are recycling businesses. Working with a private firm helps insulate the agency from any political pressures in awarding funding. The private firm earns money on the interest generated on loans they close.

The state also manages a grant program known as the Recycling Industries Reinvestment Credit (RIRC). This program offers recycling processors and manufacturers up to $50,000 per project. It offers more money than the loan fund so the two do not compete. The program originated in the state legislature as a less costly alternative to recycling tax credits. The DEP is required to designate feedstocks to target with the program—materials with little or no value in the marketplace. To designate items, the state worked with the Chelsea Center for Materials Recovery and conducted a quantitative and qualitative analysis. In FY 1999, DEP designated 10 materials include carpeting, electronics, food waste, and paint. Funding is available for capital equipment, low-interest loans, supply credits, research and development, and state or municipal purchase.

To recruit businesses, the state developed an outreach strategy that involved mailings, telemarketing, regional information sessions, followup calls, and establishing a tracking system. Mr. Long recommends keeping the program simple early on, and then making it more stringent later. Massachusetts uses a very short application—requiring a three-page narrative and one-page budget. In 1999, the state granted 10 awards totaling $400,000; this has the potential to divert 85,000 tons of waste from disposal.

Evaluation criteria include: potential market impact, investment justification, financial viability, technical feasibility, marketability, sustainability, qualifications, accountability, and financial leverage. Because it is a "service contract" and not a grant, the state requires detailed reporting on tonnage and lessons learned. He advises others to emphasize that reimbursement is expected and to make designated materials clear. Also, check the environmental soundness of proposals by having other agency staff review them.

Eileen Doherty, National Conference of State Legislators

Ms. Doherty presented the results of an informal survey of recycling market development activities in different states as well as financing tools and mechanisms:

- **Wisconsin**. The state's business surcharge (worth $300 million per year) expired April 1999. Funding will be available for the next 2 years, but the current legislature is not interested in renewing the surcharge. A tipping surcharge that raises $200 million per year makes disposing of out-of-state waste less attractive. Wisconsin has the strictest newsprint law in the United States—37.8 percent of newspaper content must be recycled.

- **Minnesota**. The state has been supporting market development for 10 years, providing technical and financial assistance, including loans for machinery to manufacture products. Recycling is not a priority with the legislature, although the Department of Natural Resources (DNR) is trying to raise awareness. The amount of funding appropriated by the legislature is declining. DNR is trying to establish a revolving loan fund.

- **North Carolina**. The state is establishing a recycling loan fund through Self-Help, a local community development bank. The loan fund targets startup and expansion companies with higher levels of risk. A 1998 JTR grant will support operation and management costs associated with the fund.

- **Nebraska**. The state has a revolving loan fund for up to $250,000. The state also administers community development block grants; $4.1 million is allocated for litter reduction, recycling, waste reduction, and scrap tire management. An Environment Trust Fund, funded by state lottery proceeds, supports market development. The legislature has supported market development; currently, LB 592, which would use 40 percent of a $1.25 per ton tipping fee surcharge for waste reduction and recycling, is a priority bill.

- **Oregon**. The state does not use public funding for market development. Oregon offers tax credits for capital investment in recycling machinery and small grants on the local level. The legislature sets mandates without funding. The state encourages private stakeholder involvement.

Many states are moving towards grants and loans rather than tax credits because it is less costly. New Jersey, however, believes tax credits helped build infrastructure more quickly and helped retain industry in the state. The most successful market development programs combine financial tools with technical assistance related to environmental permitting and reporting requirements.

In working with legislators, she suggested building relationships, educating them, building champions, recognizing their short-term focus, and making it clear what is in it for them.

Q: Why did Massachusetts pick a limited group of materials for its credit program?
A: We target low value materials since they need the most support. We can add or drop materials at any time.

A: In New York, we offer grants and loans and match the funding with our priority materials. In Illinois, entrepreneurs are beginning to reach their limits with market opportunity. We need a software tool to help analyze workforce, production, inputs and outputs, and strengths and weaknesses.

Q: If competing companies apply, how do you decide who gets funded?
A: In Massachusetts, we review the business plans and give each company a score based on our quantitative and qualitative analysis.

Q: How do you manage a 0 percent default rate?
A: In Alameda County, many of our staff have more than 20 years of experience. These individuals are very experienced at screening applicants. Also, when businesses must put up collateral, they take it more seriously.

A: In Alameda, the number of loans we award will probably decrease during the next 2 years. A lot of lending institutions are becoming more lenient in what they are willing to loan because the economy is strong and a lot of money is available. It is as easy now to go to a local commercial bank.

Q: How do you avoid surrendering sensitive information through a Freedom of Information Act request?
A: We do not keep certain information in the office which limits what is available. As long as documents are "working papers," they are not part of the agency record and thus are not public information.

A: NCSL is gathering state legislators at its annual conference in July in Indiana to discuss what has and has not worked with recycling market development.

Market Development in Rural Communities: Enterprise Ideas and Cooperative Marketing

Kay Stevens, Nebraska State Recycling Association

Ms. Stevens provided an overview of cooperative management as a market development strategy in rural communities. She noted common barriers to healthy recycling include inadequate funding, distances to frequently unreliable markets, over dependence on volunteers and grants, and a lack of discipline in the marketplace.

Consumer-based cooperative management is a strategy to improve the efficiency of recycling market development. The first step is to create an organizational structure for decision-making, which includes defining service levels and bids for service contracts. By pooling fees and costs, communities can split costs in poor markets and share profits in strong markets. The arrangement offers benefits to buyers as well, including a single point of contact, better and more reliable quantities and qualities, more predictable volume and cash flow, improved investment potential based on contracts, and standardized material specifications. Cooperatives provide small businesses with access to markets, economies of scale for transportation, and improved price stability.

Cooperatives allow consumers to control service quality and costs, eliminate long-term grant dependency, link costs to level of service not market prices, and provide freedom from market fluctuations. Weaknesses include the risk of political scrutiny, redistributed revenues, the need for inter-community agreements, and a required dollar commitment in rural areas.

Keys to success include tracking materials and costs, developing supply data, sharing equipment and information, and investing in competitive bidding, written specifications, contracts, and franchise agreements. A series of rural recycling workshops are planned in 1999: Council Bluffs, Iowa, in July; Amarillo, Texas, July 13 to 14; North/South Carolina in October; and Fort Wayne, Indiana, in October.

Mickey Mills, Bluegrass Regional Recycling Corporation (BRRC)

In Kentucky, 32 cities and counties have joined together to create the Bluegrass Regional Recycling Cooperative, a regional materials processing network. By pooling their resources, the communities produce sufficient volumes of recyclables for marketing purposes. To process materials, BRRC transports items to regional grading and separation transfer points, then to a central processing facility, and finally to industry end markets. BRRC's transportation network allows even small municipalities to

participate. The key is to encourage all areas of the state to participate to develop the supply infrastructure necessary to attract industry.

BRRC is working to supply the U.S. Army Corps of Engineers with environmentally preferable log booms (the former ones used creosote). To complete the project, the Mountain Economic Development Foundation financed Appalachian Environment Products to initiate product development. Cycle Master extrudes the raw plastic feedstock and Fix-Corp washes and pelletizes the plastics to specification for manufacturing.

BRRC also is planning a resource recovery research park that will conduct research and development, laboratory testing, and data processing and management. A number of companies have expressed interest in the park. They see the it as an economic opportunity, but also as a chance to divert waste, educate the public, and promote recycled-content products. BRRC plans to offer prison inmates employment opportunities at the park, linking to welfare-to-work programs. A conference is planned August 9 to 11, 1999, to discuss these issues in more detail.

Steve Boyd, California Integrated Waste Management Board

A wide variety of recycled-content products have been successful in California, including carpeting, pencils, gridcore, plastic pipe, bags, plastic signs, and compost. Building strong relationships with businesses is a key to this success. In order to make these systems work in rural areas, businesses need to add local value to materials. Involve local manufacturers and review their marketing efforts. Form cooperatives, whether in manufacturing or marketing. Economics often do not work in rural areas because there is no critical mass of supply or demand and transportation costs are high.

The markets for fire logs, for example, are constrained because the logs are heavy and need to be sold locally. If the logs are broken down into fire starters, they can be sold further away. If they are broken down further, they become fire lighters, and can be shipped further away. Other products, such as novelty items, tend to sell well, as do pot holders, rugs, and bags made from recovered textiles. Other products include mats and tree ties, mouse pads, sculptures, anchors (containing used mirrors and chrome from junkyard cars), and threshold ramps for wheelchairs. Some companies collect vegetable scraps from restaurants for composting; they charge restaurants a fee and sell the worms and the compost.

Key steps to success include 1) identifying the recovered material, taking into account quantity, quality, and price, 2) identifying the product, taking into account the value-added potential, 3) and reducing risk any way you can. A Web site at <www.recyclestore.com> can help reduce costs for small manufacturers by acting as a cooperative that markets many products centrally.

Q: What is your point of entry with the entrepreneurs?
A: In California, we try to do all we can to help, but do not evaluate their idea. We simply point entrepreneurs in the right direction. We attract individuals through references and by providing information at the local community college.

FRIDAY, APRIL 16

Concurrent Commodity Workshops: Glass

Bob Kirby, CWC

Mr. Kirby discussed the markets for recovered glass and both public and private sector approaches to market development. He stressed that technical specifications are needed to support market development—creating an "information infrastructure" comprised of technology, specifications, and case studies.

He then noted there are only two markets that can be considered "national markets": container manufacturing and fiberglass manufacturing. Of the others, only construction aggregate and blasting abrasives are consuming significant amounts of glass nationally.

He then discussed the results of a CWC report, *Evaluation of Recycled Crushed Glass Sand Media for High-Rate Sand Filtration*, which compared the performance of recycled glass sand media to conventional sand media. The report showed that the use of recycled sand media improved water clarity, increased backwash efficiency, and required approximately 20 percent less glass sand for filtration. For a copy of the report, contact CWC at 206 587-5520 or visit <www.cwc.org>.

Mr. Kirby noted once you bring a company to a certain technical level and they become sustainable, they might decide your assistance is no longer necessary. He also discussed local situations in which recovered glass is viable. These include tile making; pressed glass; fused stuff manufacturing; septic treatment; and small projects such as counters, floors, and artwork. Other applications include bottlewashing and miscellaneous industrial powders.

Ideal private sector projects involve realistic expectations and companies prepared to invest their own money. Ideal participants include a researcher or experienced technical consultant, potential or current processor, potential or current manufacturer, distributor, and knowledgeable end user. Also, when a project fails, you must be willing to end the project; however, be sure to document what went wrong and the lessons learned.

Ideal public sector projects should identify the need, determine the technical feasibility, find the right partners, identify the controlling agencies, and determine the testing required. Other factors include finding the budget, doing the testing, negotiating specifications with agencies, and documenting case studies to leave a legacy. He concluded by discussing a best practices manual on glass recycling that includes information on sourcing, processing, product manufacturing, and end use applications.

Fred Miller, TriVitro Corporation

TriVitro Corporation produces an abrasive blasting material, VitroGrit, made from 100 percent recovered glass. Their products can be used for blasting on concrete for graffiti removal, structural steel, tanks, barges, cars, and electrical motors. The material has a sharp, angular shape and is available in both 50 and 100 pound sacks and bulk bags. Blasting on boats, for example, is effective because the material is very light, sharp, and precise and can target small sections without blasting wide surfaces. To process and prepare the material, the company uses crushers, magnets, and air classifiers.

Regarding barriers to buying recycled, he mentioned that Executive Order 13101 has not been taken seriously by many federal purchasing agents. Also, there is confusion regarding material specifications; glass is referred to by other names such as "silica slag" and "amorphous silicate." Also, there are inaccurate perceptions about the material being dangerous. Market developers can assist with procurement efforts and by developing specifications so that unsophisticated companies are held to quality standards.

Brenda Grober, New York Office of Recycling Market Development

Ms. Grober discussed her office's current recovered glass projects. One project will assess whether a one-pass system handling 15 tons of glass per hour is feasible and capable of producing different sized cullet. A rural demonstration project with USDA will explore opportunities for recovered glass as a drainage material on farms. With each project, New York is able to protect its research for up to 2 years to prevent public access to proprietary business information.

Challenges to glass recovery projects include finding companies to test materials so specifications can be written, convincing companies to respond to new specifications, and working with engineers to actually use the recovered materials. General barriers to glass market development include unsophisticated processes and technology, concern with optical sorting technologies, and negative perceptions of glass recovery by businesses and the general public.

Concurrent Commodity Workshops: Organics

Ron Alexander, Alexander Associates

Mr. Alexander focused on the challenges and opportunities of organics market development. He began with a discussion of biosolids, noting the importance of understanding the amount of biosolids (e.g., animal manure) that are part of the solid waste stream and the range of possibilities available. With biosolids, he anticipates increased collaboration between waste water treatment staff and solid waste professionals. This will be critical because of the need to coordinate regulatory oversight.

In addition, he noted the recent public backlash to using biosolids in compost. In fact, over the past year, he believes the industry has regressed somewhat. Because biosolids management can be such an emotional issue for the public, education is needed to show the benefits of composted biosolids—composted biosolids kill pathogens, weed seeds, and binds metals tighter by matrix, for example. In terms of safety, he does not believe there is a "smoking gun" at this point.

Mr. Alexander then spoke about composting in general. He noted composting is a controlled biological process. It produces a valuable soil amendment that can improve water retention, suppress weeds, control erosion, and add beneficial microorganisms to the soil. When producing compost, temperature must be monitored to optimize the process. It can take between 12 weeks (for composted biosolids) to one-year (for some backyard composting) to develop a finished product.

As the industry matures, composters are beginning to see themselves as product manufacturers, providing a valuable feedstock. Recyclables increase in value as they are processed into a higher quality feedstock; similarly, compost increases in value as it moves through the manufacturing process. Just like with

recyclables, compost can be taken out of the processing system at any stage to meet the needs of different clients. A homeowner, for example, might want a stable, low nitrogen compost product where a farmer might want higher nitrogen levels. Inventory management and contamination issues are as important with compost as any other recyclable feedstock.

The characteristics of a compost product help determine what it can best be used for and in which markets it can most easily be sold. In other words, compost producers must meet end user requirements. Product consistency is key. A new publication from the Composting Council, *A Field Guide to Compost*, provides typical characteristics of municipal feedstock-based composts. It is intended to help composters compare their nitrogen and phosphorus levels with industry averages.

According to *Biocycle* magazine's "1999 State of Garbage in America," future areas of growth include food composting at the commercial and institutional level and using nonrecyclable paper in compost. Water quality issues, in part, are driving an increased demand for compost. In Portland, for example, all restaurants will be charged $900 per ton to dispose of food scraps as of July 1, 2001, to discourage disposal. Other cities are looking at the cost of composting food scraps versus handling the material through the municipal waste water system.

In Nebraska, telephone surveys identified several individuals who are burying food waste instead of composting, partly due to the cost of collecting food scraps. In Iowa, low tipping fees are a major disincentive to composting. Tipping fees near a new composting facility range from $16 and $48 per ton. Both Nebraska and Iowa see contracting with the private sector to take the compost as a major opportunity.

Mr. Alexander then discussed trends in the composting industry. These include advances in processing and infrastructure, increased training opportunities, more sophisticated marketing efforts, increased demand for organic farming, and facilities producing more than one product—from mulch for playgrounds to compost for erosion control.

He then noted a wide variety of equipment is now available including horizontal grinders (which are safer and low maintenance), hog grinders for small generators, food grinders, and new screening devices to efficiently separate out bulking agents. One type of equipment colors mulch for landscape architects while another applies compost more efficiently using a 300-foot hose that blows out compost as top dressing.

Increased field research is needed to learn more about what happens physically, chemically, and biologically when compost is applied to the ground. In addition, there is a need for increased promotion such as a national educational campaign on composting. Existing tools include training seminars, field guides, best practices in composting workshops, and videos.

Compost is not included in landscaping specifications for cities and communities. To help address this barrier, CWC published a report with model specifications. Other challenges include inconsistent product quality, lack of market research and planning, minimal understanding of market nuances and end user requirements, a "dump it" mentality, lack of investment, and lack of basic marketing knowledge.

Nevertheless, compost is slowly becoming more integrated with mainstream products. Rapidly expanding markets include "bag and bulk" compost for homeowners, topsoil blenders/custom blending, and environmental and agricultural applications.

Recommendations include investing more effort into product marketing, upgrading product quality, determining why facilities are understaffed, and changing pricing policies for the finished product. Finally, producers should develop a name for their product and build a product line. Attaching a company name to the compost will increase the credibility of the finished product.

Public/Private Partnerships and Urban Renewal Projects

Allen Hershkowitz, Natural Resources Defense Council (NRDC)

Mr. Hershkowitz discussed the Bronx Community Paper Company project. The goal of this project is to develop an innovative recycling newsprint mill and bring hundreds of livable wage manufacturing jobs to one of New York City's poorest neighborhoods. When built, the $370 million, 500,000-square-foot facility will consume one-half of the wastepaper collected in the city of New York or approximately 300,000 tons per year. The project will serve as a nationwide model demonstrating it is possible to use environmentally sound technologies to simultaneously create hundreds of new jobs, make a profit, and conserve the earth's limited resources.

The project is a joint venture between NRDC and the Banana Kelly Community Improvement Association. The environmentally sustainable facility was designed by Maya Lin, best known for her work on the Vietnam War Memorial in Washington, DC. The most significant hurdle the project has faced has been attracting a paper company to invest in an urban area. Companies are often reluctant to build facilities in the city due to high real estate costs and inherent political and regulatory challenges. In June 1996, the project received final approval from the state and the Governor announced the state would sell tax-free bonds to secure $75 million in low-cost financing for the project.

A key lesson learned is recognizing the community is a key partner in any urban renewal project. Throughout the development process, the project partners have kept the public continually informed on the project's progress. In fact, during the environmental licensing process, the partners held more than 120 public meetings with members of the South Bronx community, although by law a developer is only required to hold one.

Ed Connelly, Cleanscape, Inc

The South Providence Development Corporation (SPDC) was developed by the Providence Hospital 3 to 4 years ago in an effort to help the neighborhoods around the hospital that have been negatively impacted by the hospital. The first business to be developed by Mr. Connelly at SPDC was Cleanscape, Inc., which will collect all of the recyclables from the hospital. Mr. Connelly sought financing from low-income financing agencies using a well developed business plan. These agencies were eager to work with him as they usually only work with restaurants and bars and were interested in an environmental business. He also used the existing community development structure to help with financing. Cleanscape, Inc., is a wholly-owned subsidiary of the SPDC but in 5 years will be employee-owned. He expects Cleanscape, Inc., to be up and running by July 1999.

Mr. Connelly is also developing two other businesses. The first is a company that will make furniture out of homosote made from ONP and compost for urban soil remediation using hospital and other

institutional food scraps. Additionally, he is developing a deconstruction reuse center for used electronics at which developmentally disabled adults will do the deconstruction. For this venture, SBDC obtained funding from the Cooperative Fund of New England which funds religious organizations as well as cooperatively-owned businesses.

Case Studies of Recycling Business Financing

Edgar Miller, National Recycling Coalition

Mr. Miller discussed NRC's National Recycling Financing Initiative as well as trends and resources for the recycling industry. He began by listing the following recycling business trends: many recycling companies face the same challenges as all businesses, mergers and acquisitions (there were more than 225 acquisitions and 750 consolidations between 1995 and 1998), increased efficiency, greater use of full cost accounting, joint ventures between end users and processors, increased vertical integration, a renewed focus on the quality of recovered materials, and decreased virgin material costs.

He also discussed the challenges facing recycling businesses, which include market volatility, regulatory uncertainty, new technologies, and competition with virgin materials—all of which add up to high risk for recycling businesses.

NRC's financing initiative has developed the following tools:

- A Web site at <www.nrc-recycle.org> with financing resources.
- *Beyond the Bank: A Primer on Non-Traditional Financing Strategies for the Recycling Industry*, which includes characteristics of business types, a map of financing options, and strategies for first and second stage companies, as well as broader environmental companies.
- *Government and Community-Based Sources for Financing Recycling Enterprises*, which provides historical and current pricing trends, contacts and survey research, and an appendix of grant programs.
- *Financing Strategies*, a brief overview of targeted sources of equity and debt financing and financing resources.

Current projects include case studies of financing sources and debt-to-equity ratios, technical assistance and outreach, and workshops. NRC has identified the need for business development and planning assistance, company and commodity-specific assistance, and referrals and investor contacts for specific companies. He concluded by describing the Sustainable Jobs Fund, a project that will capitalize a $10 to $15 million community development financial institution on the east coast.

John McClurg, Fire & Light Originals

Fire & Light is a small company founded in 1995 that manufacturers a range of glassware products using recovered glass from the local community. Fire & Light originally intended to manufacture glass tiles, but decided instead to manufacture decorative glassware.

In 1995, the company raised $172,000 to construct its facility and finance its furnaces. By early 1996, the company realized it needed additional capital so it sold stock to raise $100,000. The company also tried to secure a $200,000 loan. Within days of signing the loan, however, the company learned it could not guarantee the loan. To help, the local economic development organization "came to the rescue" and became a strong partner and advocate for the company. Several months later, with the help of the organization, the loan was approved.

By November 1999, the company needed additional help. Mr. McClurg joined the company to help:

- Hire a seasoned glassware professional to bring more technical expertise to the company (they continued to ruin furnaces because the operators lacked experience).

- Hire a general manager (at the time the company was run by committee).

- Put together a package of financing resources. Currently, Fire & Light draws upon a diverse portfolio including friends and family, local investors, the local economic development commission, sale of additional stock, a USDA Old Growth Diversification Loan, Community Development Block Grants, and the USDA Rural Enterprise Loan Program.

In his experience, small recycling companies tend to be undercapitalized and use unproven technologies and markets. He expects Fire & Light to accrue losses for the next several years (primarily due to the cost of very capital-intensive equipment), but then become profitable. He advises other companies to think through plans upfront, forecast projections, gather outside opinions, and partner with local and national economic development organizations. Also, gain the support of elected officials (state senators toured their facility), understand the process for securing grants, and coordinate with multiple state agencies together. Fire & Light currently supports 11 jobs and hopes to create another 19 over the next several years.

Q: Why did you switch from the construction tile business?
A: It can take a long time and be expensive to break into that market. Early on, we recruited a local artist who showed us the possibilities of decorative glassware. All but one of our products contain 100 percent recovered content. Over time, we hope to establish facilities in other parts of country. Once we iron out the details with our facility, it will be much easier to expand to other sites.

Cesar Castro, MBA Polymers

MBA Polymers was founded in 1994 as a research group to study the recovery of plastics from durable goods. Today, MBA has grown to the most comprehensive facility in the world for recycling plastics from durables. MBA Polymers produces high-value engineering plastics from recovered durable plastics (e.g., laptop computers and overhead projectors). All of their products contain 100 percent recovered plastics.

In recent years, the amount of plastics disposed of in landfills has grown relative to glass, metals, and aluminum. This is because other materials are recycled at a much higher rate. The rate of recovery for engineering plastics is approximately 2 percent. Although they are very valuable, engineering plastics are difficult to recycle because other materials (e.g., metals, labels, other plastics) are usually attached.

Mr. Castro explained MBA's production process, which includes 1) reducing material size and liberating course materials, 2) separating nonplastic items (e.g. through air classification), and 3) separating mixed plastic streams (which is the most difficult part). To increase efficiency, the company emphasizes automated operations and high throughputs.

The facility has handled a whole range of items including automotive bumpers, car interiors, ski boots, radiator end tanks, and appliance interiors. Today, the company primarily processes computers and electronics. A regrind flake material is the finished product. MBA strives to produce a consistent, reliable stream of plastic to meet the demands of the market and original equipment manufacturers.

The company received $7 million in funding from the American Plastics Council, Vehicle Recycling Partnership, computer and electronics industry, as well as federal, state and local grant and loan programs. Mr. Castro discussed a variety of debt and equity financing sources and the advantages and disadvantages of each:

Debt Financing

Financing Option	Advantage	Disadvantage
Friends and family	• may be the quickest and easiest access to cash	• need to urge them to do due diligence
State and local government agencies (loans and bonds)	• can be very low interest rates • can keep technology you develop	• must be paid back • many require 100% collateral • many require personal guarantees • must be approved as with traditional debt
SBA and Banks	• can help those with little history and credit	• as above, plus less attractive rates and terms
Leases: banks, venture leasing, equipment vendors	• can keep technology you develop • easy to get new equipment	• interest rates higher than with state loans or bonds • you cannot use equipment for loan collateral
Private industry	• may provide tie-in to customers • less reporting issues • demonstrate commercial interest to investors	• can be difficult to reach • must clarify who owns technology and terms

Equity Financing

Financing Option	Advantage	Disadvantage
Friends and family	• may be the quickest and easiest access to cash • could be great deal	• need to urge them to do due diligence • usually requires numerous investors
Angels	• many angels available and socially and environmentally minded • some angels can bring management skills	• normal maximum is less than $1 million • may need a group of investors
Venture capital (traditional, social or environmental funds)	• a lot of resources available • can fund quickly (less than 2 months) • can provide excellent contacts • can provide management expertise • focused on business growth	• want very high return, 30 to 40% • most focus on high-tech businesses • very few environmental investors • opportunity must demonstrate fast and large potential • most want exit strategy at 3-5 years • may want to change management • many have other terms

MBA Polymers has participated in three venture capital forums and plans to participate in a fourth forum this year. The forums provide significant opportunities for networking as well as a lot of coaching and free advice. They also offer the opportunity to talk to other presenting companies who face similar issues. The disadvantage is that venture capitalists expect a high rate of return. Companies must demonstrate a fast growth potential; otherwise, the investors will likely make changes in ownership and bring in outside management. Most require a seat on the board of directors.

Q: Which has been more fruitful—public or private sources of funding?
A: Private financing has been the most fruitful. It has given our company the technology base to launch into new strategic partnerships. We also have received a mix of debt and equity financing.

Q: How did you partner with the automotive industry and others?
A: We either contacted them directly or worked through associated organizations, such as the APC.

Q: How much financing have you raised so far and what are your future goals?
A: At MBA Polymers, we have raised $1.2 million from friends and family. We are looking to raise another $5 million this year and $5 million next year. Future financing will be used to support extrusion and pelletization, a quality control laboratory, and an advanced plastics product line to handle multiple mixed streams at high throughputs. Our sales are currently at $3 million per year. We have been profitable for the past 5 years. As we invest in new equipment, we anticipate an initial dip in profits followed by increased revenues.

Q: What region does MBA Polymers get its supply from? Only California?
A: Yes, we are mostly supplied by sources throughout California. Transportation costs are a large barrier

to shipping from longer distances. We are talking with sources nationwide, however.

EPA's JTR Program: Its Results, Its Outlook, Your Needs

John Leigh, EPA JTR Program Manager

Mr. Leigh provided an overview of JTR accomplishments to date and discussed the future outlook for the program. Since 1994, JTR has awarded 4 different types of grants: RBACs, REDAs, investment forums, and demonstration projects. The infrastructure-building projects have resulted in impressive results: creating more than 7,100 jobs, generating $459.8 million in capital investment, creating 14 million tons of new capacity, utilizing 12.9 million tons of materials, and assisting more than 2,800 companies.

Overall, the 1994 grants (REDAs and RBACs) have been the most successful. Both the 1995 and 1996 grants have not resulted in many quantitative measures, largely because they funded demonstration projects rather than infrastructure building.

Mr. Leigh encouraged attendees to help EPA strengthen its existing resources such as the Web site and evaluation efforts by documenting success stories. He also noted EPA understands that success is not only measured in quantitative terms. One purpose of the evaluation efforts is to document more qualitative successes such as partnerships formed.

He noted it has been difficult to get reporting from grantees—partially because EPA has not always provided clear reporting guidelines. EPA has found success in information sharing—supporting the Web site, linking agencies and states through conferences and roundtables, and administering the JTRnet list server. He looks forward to building on this success in the future.

Terry Grogan, Chief, Municipal Waste Reduction Branch, EPA Headquarters

Mr. Grogan provided the Agency's outlook for the future of JTR. He applauded the grantees for all of the success they have brought to the program and noted EPA's support through the JTR program has added value to their market development efforts. He noted, however, there has been a sharp reduction in EPA financial support for recycling—both at the national and regional level. He listed a few popular initiatives that EPA was not able to financially support this year, including the U.S. Conference of Mayors Buy Recycled Training Institute, the Environmental Defense Fund outreach efforts, and the NRC's Recycling Financing Initiative.

He added, however, that EPA has continued to financially support America Recycles Day, the WasteWise program (a national "buy recycled" satellite forum is scheduled November 2, 1999), and the Comprehensive Procurement Guidelines. EPA has also supported an extended product responsibility (EPR) initiative and strengthened its analytical and data work.

Unfortunately, JTR funding has dropped from $2.7 million in 1994 to $0.7 million in 1999. This year's budget reduction is largely due to budget pressures from Congressional mandates and competing priorities within the Agency. EPA is committed to finding ways to raise the visibility of the program, such as partnering with the U.S. Department of Energy, and others on SmartGrowth programs and Federal "Green Building" initiatives. At this point, EPA needs to rethink how it allocates market

development resources and is open to suggestions.

Q: Have you considered looking outside the Agency to partner with others?
A: Through the National Recycling Challenge, for example, we partnered with several other Federal agencies which might lead to future endeavors. We welcome your ideas for programs and contacts.

Q: What is coming out of the White House Recycling meeting last year?
A: For current plans, contact the Office of the Federal Environmental Executive (www.ofee.gov). EPA supported several publications on the benefits of recycling, including a new resource with examples of public sector accomplishments. In addition, Vice President Gore unveiled the National Recycling Challenge in November 1998.

Q: Have you tried to link to the Climate Change issue?
A: Yes. A number of EPA's waste prevention and recycling programs are integrally tied to the President's Climate Change initiatives. We also developed conversion factors to estimate the climate change impacts of waste reduction and recycling as well as a Web site on this topic (www.epa.gov/mswclimate).

Trends in Materials Use and Waste Management: Impacts on Markets and Programs

George Garland, EPA

Mr. Garland gave an overview of the following projects:

- *Characterization of Municipal Solid Waste in the United States: 1998 Update.* Highlights include a 3.7 percent waste generation increase in 1997—from 210 to 217 million tons—due in part to a strong economy. The nation's recovery rate rose to 27.8 percent (from 27.4 percent). In addition, the report no longer confidently predicts the U.S. will recover 35 percent of its waste stream by 2005.

- *Biosolids Characterization Report.* The report implies that we might need to divert organics to compost to lessen the impact on waste water treatment systems.

- *Construction and Demolition Debris Characterization Report.* The report estimates 136 million tons of C&D waste is generated per year. A large portion (44 percent) is renovation waste. There are many opportunities to recover more of these materials.

- *Organics Management Report.* The report predicts potential savings of $1.36 billion or 63 million tons through grasscycling, onsite institutional composting, home composting, and commercial organics management. Grasscycling and home composting offer the largest potential savings.

- *Food Waste Report.* EPA estimates approximately 21.9 million tons of food waste were generated in 1997. This represents 10.1 percent of the total waste generated by residences, commercial establishments, institutions, and industrial cafeterias and offices.

- *Source Reduction Characterization Report.* The report estimates 23 million tons of waste was source reduced between 1990 and 1996 using 1990 as a base year. The report estimates waste

generation data relative to personal consumption expenditures. He noted some items (e.g., corrugated boxes) are "source expanding." Future characterization reports will include source reduction data.

Jerry Powell, Resource Recycling

Mr. Powell offered the following observations of the recycling industry:

- Recycling is flattening out.
- A coming stock market correction may help the older materials companies who typically engage in recycling, at the expense of high technology new firms.
- There is too much production capacity dominating too many industries (e.g., plastics and aluminum). Because of the surplus material, it is a buyer's market, which will continue to drive prices down until at least 2001.
- There are very few recycling or virgin mills being built. This is, in part, due to a disenchantment with the global recycling system and global market trends. Large exporters are suffering and now looking domestically.
- There will be more, not less, regulation. The U.S. Occupational Safety and Health Administration is looking at materials recovery facilities (MRFs). Composters will endure more regulatory controls because of odor issues.
- Disposal costs and incineration are declining. Recycling programs will be hurt by the decline in some localities since revenues for these programs are tied to disposal fees. There is little optimism that recovery rates will rebound in the next few years. There will continue to be rollbacks in processing; more than 100 MRFs have closed recently.
- Garbage itself is changing with more plastics, more office paper, and fewer recycling periodicals. Population growth in rural areas is leading to increased population growth there.
- Mergers and acquisitions are an important trend worth monitoring but the analysis might be overblown—it already happened in the 1980's with little negative effect. It is actually helping in sectors where excess capacity exists. Mergers will continue to occur, but at a slower pace.

What does it all mean? Large scale greenfields projects are not likely. More techniques will be needed to further reduce costs. There will still be a need for market enhancement efforts but they need to be linked to changes in local infrastructure. Continuing changes in waste composition are inevitable.

Peter Anderson, Plastic Redesign Project

The theme of Mr. Anderson's presentation was "plastic recycling at the crossroads." The plastics industry is under unprecedented stress and changes. It needs to learn whether the investments being made will lead to a sustainable industry. Recovered plastic resin is not as profitable as other commodities; it is

costly to produce clean flake due to shipping, baling, sorting, and other costs. Virgin resin manufactures are under intense pressure, too. The industry requires high operating costs and is currently at overcapacity. Virgin manufacturers have been engaged in a price war for the past 5 to 6 years. This has had a devastating impact on the plastics recycling industry which is struggling to compete.

To help address these issues, EPA is supporting the Plastic Redesign Project. This project is a partnership between 32 states and cities. The partnership, which speaks for the recycling community, is working with product manufacturers to encourage them to understand the impacts of their packaging changes on the recycling industry. It also provides an opportunity to better understand their perspective. The project has put forth a series of recommendations related to design for recyclability. For a copy of the recommendations, send an e-mail to <recycle@msn.fullfeed.com>.

John Young, Materials Efficiency Project

Mr. Young began by discussing global resource consumption trends: world materials consumption is growing steadily, industrialized countries consume a disproportionate share of the world's materials, the U.S. consumes 30 percent of the world's materials, and U.S. materials consumption is up 18-fold since 1900 and still rising. He noted there is a close link between resource consumption and the decline in the global environment. It is a major concern that developing countries want to emulate the U.S. He then asked whether our current rate of growth could be sustained with 4 billion people in poorer countries and our ecosystems growing close to their natural limits.

Mr. Young highlighted the growing environmental costs of virgin materials production, including deforestation and species extinctions. With global average temperatures rising, extractive industries are now altering the global landscape to a greater degree.

Because the environmental costs are externalized, they are not reflected in the prices of virgin materials. Approximately $2.6 billion in subsidies for virgin materials (including low cost energy) and tax expenditures make it difficult for the recycling industry to compete. To address this barrier, he advocates working to eliminate virgin material subsidies. To do so, he recommends allying with other, broader constituencies and pooling resources. A key step is learning who is receiving subsidies and why. Mr. Young, along with the Global Recycling Network, has documented these issues in a new report, *Welfare to Waste*, available online at <www.grrn.org>.

Q: When you recruit businesses, do you sometimes overlook unglamourous attributes for the sake of landing the deal?
A: Yes, it happens but it is few and far between.

Q: What will it take, realistically, to improve the recycling landscape?
A: The primary role needs to move away from NRC to groups like the Solid Waste Association of North America. The industry needs to find ways to use mergers and acquisitions to spawn new industries. Another strategy is to increase the cost of disposal so it is in the public's interest to recycle more.

Developing a Vision and Direction for Market Development

Will Ferretti, NRC

Mr. Ferretti noted we are at a crossroads in market development. In order to set a future course, the industry must start thinking strategically, seize opportunities, and minimize threats. Based on a group discussion, he outlined the group's opportunities, strengths, weaknesses, and threats. The group then prioritized the top three opportunities.

Opportunities:

- **#1**. Connect recycling to larger, emerging public policy issues (e.g., sustainability, EPR, climate change)
- **#2**. Publicize successes and strengths/broad public benefits
- **#3.** Link market development to larger environmental benefits and technology development

- Focus on industries that can close the loop
- Shift focus away from curbside market development
- Tap into investment movement (including socially responsible investors)
- National coordination/information sharing of projects/results
- Assess opportunities for organics waste
- Create a new framework to replace integrated waste management
- Leverage resources away from virgin resource management and agencies. Set a national materials policy.
- Link waste reduction and market development to promote efficient use of resources
- Globalization
- Basic education of consumers and specifiers
- Address barriers to purchasing recycled-content products
- Restructure JTR to reach out to new groups
- Broaden partnerships to other national advocates
- Enact a national solid waste tip fee of $0.25 per ton
- Focus on higher-value products
- Unleash purchasing power of government

Strengths:

- Being focused and setting priorities
- Tracking results
- Building a body of knowledge of practice
- Raising recycling's profile
- Good at partner building
- Leveraging expertise and dollars from other sources
- Removing certain barriers related to using recycled materials. Proved concept.

Weaknesses:

- Relative lack of business savvy among business often targeted
- We don't have enough economic/businesses/marketing savvy
- Results take time/difficult to track and measure
- Difficult to reach client base
- Opportunities for sharing our accumulated body of knowledge/practice are not being maximized
- Information/data gaps
- Lack of national level partnerships between EPA and other national organizations—GSA, DOT, NIST, DOC NGA, NCSL
- No incentives for wider adoption of successes generated from our efforts (specifications, technologies, business plans, financing strategies)

Threats:

- Lack of broader market acceptance and adoption
- Continuing lack of consumers as purchasers of buying recycled products
- Diminishing political support for recycling at state and federal level
- Diminishing EPA resources rather dramatically
- Bias against recycling
- Globalization (cheaper, easier to extract materials)
- Climate change still risky because of global volatility
- Growth might nullify all our results
- Interest in subsidizing recycling is contrary to interest in eliminating virgin subsidies

Wrap Up and Closing

Mr. Leigh thanked all the attendees and suggested they continue the dialogue on JTRnet and use the list server as a policy development tool. He also suggested EPA could organize a session at the NRC Congress in Cincinnati in September as a followup to the roundtable.